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AG-derived Technologies supporting EXPO 2005

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AIST supporting EXPO 2005

- EXPO 2005 AICHI JAPAN is being held from March to September 2005.
- AIST supports “global dialogs” by citizens with AG-derived software Cafenet.
 - ▶ Inspired by Access Grid and it was originally interoperable with AG.
 - ▶ To be suited well to consumers' use.
- Communication software Cafenet
 - ▶ Inspired by Access Grid and it was originally interoperable with AG.
 - ▶ To be suited well to consumers' use.



AG's Contribution to human society

- **Large-scale distributed collaboration**

- ▶ It is not entirely new idea, but
- ▶ Real technologies are catching up what we dream a long time ago.
 - Network is being spread and its bandwidth is being broaden.
 - Commodity PCs are rapidly getting powerful and cheap.

- Access Grid Project practices our **old dreams with today's technologies.**

- ▶ Complies computational Grids as its original vision.
- ▶ Cultivates diverse experiments:
 - Including cultural, entertainment and informal applications.
E.g. theatrical performance, our Karaoke ☺

Karaoke Grid,
SC Global 2003



Popularization of AG

- ➊ Current AGTk has room for improvement to be **consumer software**.

- ▶ IP multicast

- ❼ IP multicast supports AG's scalability.
 - ❼ But it is not easy to obtain IP multicast reachability.
 - ⊕ It is almost impossible for consumers, at least in Japan.
 - ❼ It is a troublemaker.
 - ❼ AGTk 2.x natively supports multicast-unicast bridge.
 - ⊕ A virtual venue can have multiple bridges and this architecture will be tolerably scalable.

- ▶ NAT / firewall

- ❼ Consumers live in private IP address space.
In this case, current AGTk requires router configuration.
 - ❼ NAT / firewall traversal are in great demand.

- ▶ Usability



Communication Software - Cafenet

- It is also basically video conference software.
 - ▶ Inspired by Access Grid.
 - ▶ Originally interoperable with media tools (VIC and RAT) of AGTk.
- It has been designed as consumer software.
 - ▶ To be plug'n play, works everywhere and easy to use.
- Already deployed.
 - ▶ At cafes in Tokyo:
 - © WIRED CAFE SHIBUYA, CAFE246, BOOK246, ...
 - ▶ Supports civic activities in EXPO 2005.
- Developed by Utagoe, Ltd. with support from AIST.
 - ▶ www.utagoe.com/en/cafenet.html



CAFE246, Aoyama, Tokyo



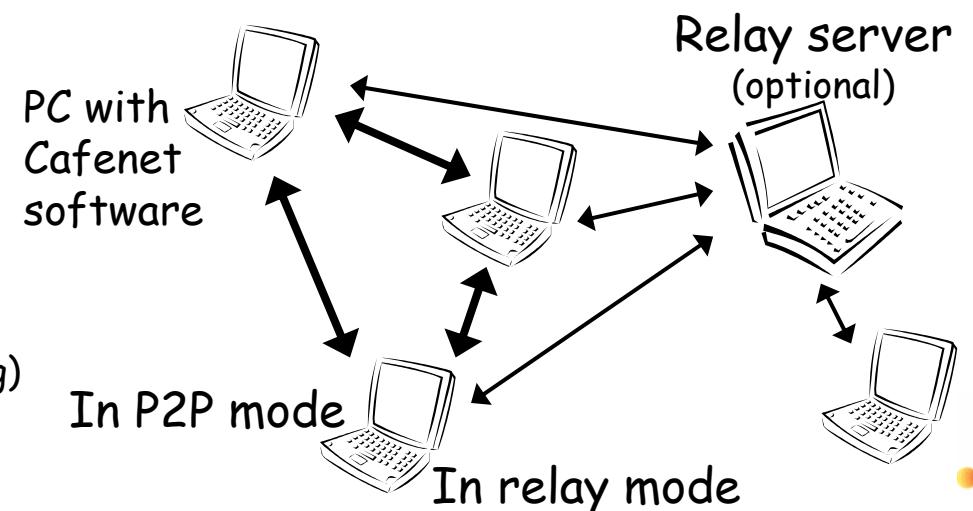
● Network

- ▶ Uses **only unicast**. No multicast.
- ▶ **Peer-to-peer** communication (and relayed communication).
 - ⦿ In P2P mode, a PC communicate with all other PCs.
 - ⦿ Yes, not very scalable and to be improved.
 - ⊕ E.g. Skype. A PC relays other's traffic.
 - ⦿ 15 or so nodes have been tested and work in P2P mode.
- ▶ A **NAT traversal** technique, UDP hole punching used.
- ▶ A **relay server** supports communication over symmetric routers.

- ▶ Open question: How can we support NAT traversal with AGTk?



Authentication and
group mgmt server
(supports UDP hole punching)



Cafenet

User Interface

- ▶ Simple and easy to use.
- ◉ Drag'n drop to move a subwindow.
- ◉ Double-click a subwindow to change its size.



Chat window



Cafenet

● Implementation

► Java

► JMF (Java Media Framework)

- ➲ Supports audio/video capture, encode/decode and transmission (in RTP/RTCP).
- ➲ Supports a large number of CODEC.
 - ✚ H.261, H263, Motion JPEG, Cinepak, MPEG4 (from IBM), ...
- ➲ A good base to develop media tools.
 - ✚ It is not too difficult to develop a new media tool based on such a substantial base.
 - ✚ Are there other substantial CODEC suites?
 - ✚ Java version of VP (from ANU) also uses JMF ?

► Runs on Windows / Linux.

- ➲ Should run on platforms which have a Java runtime.
 - ✚ Mac OS X, FreeBSD, Solaris, ...



EXPO 2005 AICHI JAPAN "Nature's Wisdom"

- From March to September in 2005.
- In Nagoya area.
 - ▶ It takes about 3 hours to get to the grounds by train from Tokyo.
 - ▶ Nagoya also has an international airport.
- It will be referred as the 1st world exposition involving active participation of citizens.



RFID-embedded admission pass



Dinosaur robot



Child-care robot



Child-care robot



Civic Project shepherding Global Dialogs

- “Global dialogs” are being held in Civic Pavilion.

- Groups of citizens (NPO/NGO) proposed their plan of dialogs. Over 200 groups have their sessions.
- In some of the sessions, Cafenet software supports distributed dialogs.
 - 40 sites prepared. Domestic and global.
 - In Japan, the northernmost prefecture Hokkaido and the southernmost one Okinawa included.
 - Foreign sites: US, Korea and China.

- An AG-derived software enables the dialogs to be “global”.

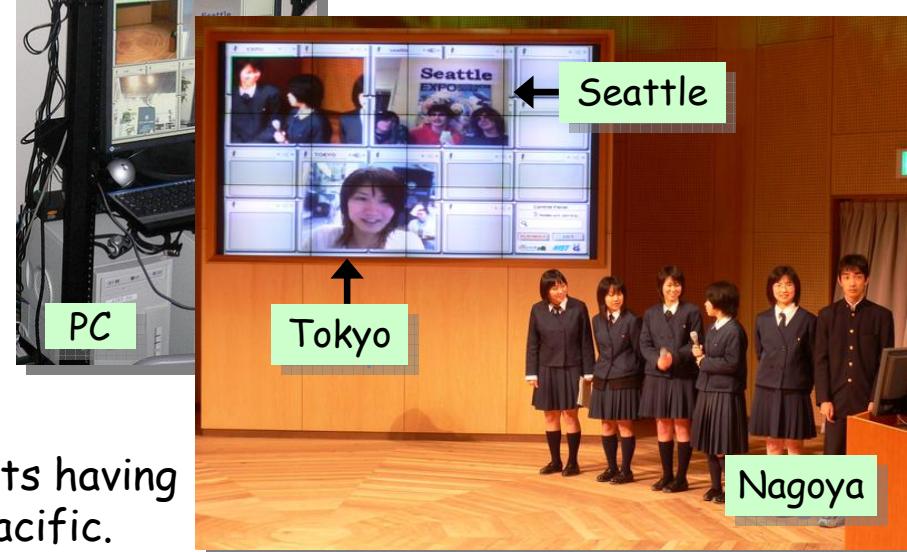
- AG-related know-how is also essential:
e.g. echo cancellation, session management and etc.



High school students having a dialog over the Pacific.



Civic Pavilion



Summary

- AG project has been able to contribute to human society.
- And experiences AG provides can be widespread furthermore with possible improvements.
 - ▶ IP multicast / unicast
 - ▶ NAT / firewall problems
 - ▶ Usability
- We have developed another communication software Cafenet inspired by AG.
 - ▶ Common goals: scalable, meeting place (venue, group) model, ...
- We support "Global Dialogs" in EXPO 2005 with the software.

